

11-8: Solving All Polynomial Equations

Warm-up: Solve for all possible solutions (real and imaginary).

1. $2x + 5 = 18$

2. $w^4 - 1 = 0$

Fundamental Theorem of Algebra:

Double Root:

Multiplicity of a Root:

The number of Roots of a Polynomial Equation Theorem:

Example 1: How many roots does each equation have?

a. $x^{15} + 1 = 0$

b. $\sqrt{2}x^4 - 3x^2 + \pi = 0$

Example 2: Consider the equation $x^4 - 6x^3 + 2x^2 - 3x + 2 = 0$.

a. How many real solutions are there? (Graph on a window $-5 \leq x \leq 10$ and $-110 \leq y \leq 40$)

b. How many roots (real or complex) are there?

Example 3: Find all roots of $x^4 + 10x^3 + 25x^2 = 0$.

Homework:

"Winning isn't everything, but wanting to win is." - Vince Lombardi